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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/599,880	02/19/2007	Willibald Dafinger	WAS0813PUSA	5961

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EXAMINER	
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ART UNIT	PAPER NUMBER
1621	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/599,880	DAFINGER ET AL.	
	Examiner	Art Unit	
	YATE K. CUTLIFF	1621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 February 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *6-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *6-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 October 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 6 - 11are rejected under 35 U.S.C. 103(a) as being unpatentable over Williams et al. (EP 098557 A1), in view of Baba et al. (US 3,404,177), Broz (3,904,656) and Lippert et al. (5,705,683).

5. The rejected claims cover, inter alia, the process for ethylene recovery in a recirculating gas process for preparing vinyl acetate wherein the gas stream from production of the vinyl acetate is separated into a product gas stream containing ethylene, vinyl acetate, acetic acid, water, carbon dioxide and non-reactive gases. The product gas stream is fed into a recycle gas scrubber charged with acetic acid to remove the vinyl acetate and leaving the recycle gas, which is fed to a carbon dioxide absorption to remove the carbon dioxide. A portion of the recycle gas is returned to the reactor without further separation of any remaining non-reactive gases, and another portion of the recycle gas without removal of any remaining non-reactive gases to process other than the vinyl acetate process. Rejected claims 7 and 8 disclose uses for the ethylenic gas recovered from the process of claim 6. Rejected claims 8-11 further disclose the reaction conditions.

Williams et al. discloses a process for preparing vinyl acetate by reacting ethylene, acetic acid and oxygen in the presence of a PD/Au support catalyst; and recovers unreacted ethylene gas from the vinyl acetate reaction process. The vinyl acetate reaction process is carried out above atmospheric pressure, (0.5 barg to 20 barg) and at temperatures ranging from 100°C to 400°C. (see page 2, lines 43 – 56, page 4, lines 43-44). Williams et al. operates at high ethylene concentrations and seeks to reduce the amounts of inerts in the recycle gas because it increases the loss of

ethylene. However, the numerous methods for **reducing/minimizing/eliminating** inerts in the ethylene recycle is an indication that Williams et al. recognizes that there is a likelihood that inerts will consistently remain in the ethylene even after a treatment to remove carbon dioxide and inerts. Williams et al. recovers the unreacted ethylene from the gases withdrawn from the **reactor** used for making the vinyl acetate, by membrane separation or **chemical treatment**. The chemical treatment process may comprise steps (i) separating the condensable products form the gases by condensation, (a') contacting the gases of step (i) with acetic acid in a scrubber to remove residual vinyl acetate product, (b') treating the product of step (a') with a water scrubber to remove acetic acid and (c') removing carbon dioxide from ethylene in the product of step (b') by using a Benfield system. (see page 4, paragraph [0028] – [0034]). The Benfield system is a carbon dioxide removal system that uses absorption. Williams et al., in Figure 5 shows that selectivity of the process becomes increasingly selective toward the production of vinyl acetate as the concentration of ethylene is increased beyond 60%. Additionally, Williams et al., in Figure 3 shows that an increase in ethylene concentration decreases the rate of carbon dioxide production decreases.

Williams et al. fails to explicitly teach that a portion of the recycled ethylene treated and recover not reused in the vinyl acetate process is used in processes other than preparing vinyl acetate.

Baba et al. discloses that the ethylene product (noncondensable gas) recovered from the vinyl acetate processing maybe treated to separate all or a portion of the carbon dioxide therefrom prior to recycling back into the synthesis reaction zone. (see

column 3, lines 62-66). Further, in the figure of Baba et al., the noncondensed gases from separator 5 is removed via line 16, and may be recycled to line 10 via line 20 or a portion thereof treated to remove the net carbon dioxide produced during the synthesis reaction. (see column 5 lines 59-63). Baba et al. basically stands for the teaching that it is within the purview of the ordinary person skilled in the art that a portion of the recovered ethylene can be returned to the vinyl acetate process, versus the entire amount of ethylene. Baba et al. fails to disclose what happens to that portion of the noncondensable gas not returned to the vinyl acetate processing system.

However, Baba et al. disclosed that a portion of the noncondensed gases does not have to be recycled back into the vinyl acetate process, nor is it stated that the non-recycled portion is purged by venting. Therefore, based on Baba et al. vent purging is not always the end step for that portion of the recovered ethylene product not used for vinyl acetate production.

Williams et al. and Baba et al. each fail to explicitly disclose process for the use of the ethylene recovered from the process of preparing vinyl acetate in processes other than a vinyl acetate process. However, Baba et al. is silent on this part and by silence leaves open the possibility that the skilled artisan would make use of a portion of the recovered ethylene in other reaction processes in order to make the process cost effective.

For example, the ethylene recovered can be used in a process like Broz to produce monoethylene glycol and ethylene oxide; or a process such as Lippert et al. involving the carbonylation of olefins.

It would have been obvious to one of ordinary skill in the art to separate the recycled gas obtained from the vinyl acetate process of Williams et al. into a portion for reuse in the vinyl acetate process and another portion for other processes since Babe et al. discloses the recirculation of only a portion of the recovered ethylene, with the carbon dioxide removed, into the synthesis reaction with the use of the other portion left undetermined.

Further, It would have been obvious to one of ordinary skill in the art to take the recovered ethylene from a vinyl acetate process as suggested by Williams et al. and Baba et al., and take the other portion and use it in a separate reaction type such as the reaction of Broz or Lippert et al. to achieve the claimed invention.

Thus, the limitation of using a portion of the recovered ethylene in other process different from the vinyl acetate process is deemed to be obvious absent a showing of unexpected results.

A reference is good not only for what it teaches by direct anticipation but also for what one of ordinary skill in the art might reasonably infer from the teachings. *(In reOpprecht* 12 USPQ 2d 1235, 1236 (Fed Cir. 1989); *In re Bode* 193 USPQ 12 (CCPA) 1976). In light of the forgoing discussion, the Examiner concludes that the subject matter defined by the instant claims would have been obvious within the meaning of 35USC 103(a). From the teachings of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention. Even though Williams et al. uses all of recovered ethylene in its vinyl acetate process, and Baba et al. discloses the amount of ethylene returned to the vinyl

acetate process is a matter of choice, and is would appear that the use of any recovered ethylene not used with the vinyl acetate process would be within the purview of the ordinary person skilled in the art. Especially since dependent claims 7 and 8 are drawn to known processes that use ethylene which skilled artisan would have been motivated to do in order to make the process more cost effective.

Therefore, the invention as a whole was *prima facie* obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the references, especially in the absence of evidence to the contrary.

6. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williams et al. (EP 098557 A1), in view of Baba et al. (US 3,404,177), Broz (3,904,656) and Lippert et al. (5,705,683).

Rejected claim 12 teaches a process for ethylene recovery where the product gas stream separated form the reactor in step b) in addition to the ethylene, vinyl acetate, acetic acid, water and carbon dioxide include, ethane, oxygen nitrogen, argon and methane in varying amounts, omitting the percentage of vinyl acetate and acetic acid in the product gas stream.

Further, rejected claim 13 teaches a process for ethylene recovery where the ethylene recycle stream, following treatment to remove carbon dioxide in step e) is comprised of ethylene, carbon dioxide, ethane, oxygen, nitrogen, argon and methane.

Williams et al. in view of Baba et al. substantially disclosed the instant claimed invention. See 103(a) above. Further, the process of Williams' states that the ethylene used in its process may be admixed with one or more of nitrogen, methane, ethane,

carbon dioxide and water in of the form of a stream. (see paragraph [0026]). Also, Williams discloses that the reaction system has nitrogen, methane, ethane, ethylene, argon, oxygen, carbon dioxide and acetic acid. Williams chemically treats the recovered gas stream to remove vinyl acetate, acetic acid and carbon dioxide. (see page 4, paragraph [0028] and [0034])

Baba et al. uses a different catalyst but discloses a resulting reaction product mixture of vinyl acetate, acetic acid, ethylene, oxygen, carbon dioxide, trace amount of aldehyde and water. Further, Baba states that the operation conditions can result in reaction product that has vinyl acetate, acetic acid, ethylene, oxygen, carbon dioxide, trace amount of aldehyde, water, and nitrogen and argon in varying amounts. (see column 4, lines 47-75).

Williams et al. and Baba et al. fails to explicitly disclose process for the use of the ethylene recovered from the process of preparing vinyl acetate in processes other than a vinyl acetate process; the claimed weight percentages for the composition mixture of the product gas stream of step b); and the claimed weight percentages for the composition mixture of the ethylene recycle stream.

With regard to the process for the use of the ethylene recovered from the process of preparing vinyl acetate in processes other than a vinyl acetate process, Applicant is directed to the discussion in paragraph 5 above.

With regard to the weight percentage of the composition mixture of the product gas stream of step b), Williams discloses that when the recovered ethylene is introduced into the reactor at the step for vinyl acetate production at least the

composition is at least 60% ethylene. Baba discloses the weight percentages synthesis product mixture (line 12 of figure), which would be the equivalent of Applicant's product gas stream. Further, Baba discloses the weight percentage of the ethylene recycle in Table II (line 20 of figure), which includes a chemical reaction process to separate the carbon dioxide, acetic acid and vinyl acetate.

Neither reference fully disclose each of the claimed weight percentages, however, Baba especially discloses weight percentages for both the product gas stream and the ethylene recycle stream that are substantially close to the weight percentage for the composition mixtures in the claims. However, a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. Titanium Metals Corp. of America v. Banner, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985)

In William et al. and Baba et al. both disclose processes for recovering ethylene from a vinyl acetate process that react ethylene, acetic acid and oxygen with a heterogeneous catalyst. Both references return a recycled ethylene stream to the process that has removed the carbon dioxide and with the preferred amount of ethylene being in the 80% range.

It would have been obvious to one of ordinary skill in the art to separate the recycled gas obtained from the vinyl acetate process of Williams et al. into a portion for reuse in the vinyl acetate process and another portion for other processes since Babe et al. discloses the recirculation of only a portion of the recovered ethylene, with the

carbon dioxide removed, into the synthesis reaction with the use of the other portion left undetermined. Additionally, since the reaction process of both the Williams et al. and Baba et al reference use similar reactants, similar steps, similar conditions, and produce similar reactant products at the end of vinyl acetate product step and the ethylene recover step; the weight percentage of the composition mixture of the product gas stream and the ethylene recycle stream are within the purview of the skilled artisan.

For the reasons set forth above in paragraphs 5 and 6, It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to recover and recirculated the recovered ethylene from a vinyl acetate process as suggested by Williams et al. in view Baba et al. then take a portion of the recovered ethylene, not returned to the vinyl acetate process, in other process such as that of Broz or Lippert et al.

Therefore, all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as clamed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention. KSR International Co. v. Teleflex Inc., 550 U.S. ___, 82 USPQ2d 1385 (U.S. 2007).

7. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Williams et al. (EP 098557 A1), in view of Baba et al. (US 3,404,177).

8. Applicant is reminded that claim 14 is claimed in a Product-by-Process format. The PTO takes the following position with respect to Product- by-Process claims. Even though product-by-process claims are limited by and defined by the process,

determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698,227 USPQ 964, 966 (Fed. Cir. 1985). The structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is made, or where the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product. See, e.g., In re Garnero, 412 F.2d 276, 279, 162 USPQ 221,223 (CCPA 1979). "The Patent Office bears a lesser burden of proof in making out a case of prima facia obviousness for product-by-process claims because of their peculiar nature" than when a product is claimed in the conventional fashion. In re Fessmann, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974). Once the examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983).

Response to Arguments

9. Applicant's arguments, see pages 6, 7 and 10 - 12 filed February 19, 2008, with respect to the rejection(s) of claim(s) 6 and 9-11 under 103 (a) as being obvious in with the combination of Williams et al. (EP 0985657) and Russell (GB 1264377) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Williams et al. (EP 098557 A1), in view of Baba et al. (US 3,404,177).

10. Applicant's arguments, see page 12, first full paragraph filed February 19, 2008, with respect to claims 6, 7 and 8 under 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Williams et al. (EP 098557 A1), in view of Baba et al. (US 3,404,177), Broz (3,904,656) and Lippert et al. (5,705,683).

11. Applicant's Arguments filed February 19, 2008, states that the claimed invention is directed to the production of vinyl acetate. However, the invention as claimed is directed to ethylene recovery in a recirculating gas process used to prepare vinyl acetate. Applicant states that the claimed invention teaches that the ethylene removed from reactor process stream has been treated to remove carbon dioxide, but not other non-reactive gases (inerts) prior to recirculating a portion to the vinyl acetate process and another portion to separate processes the use ethylene. Further, Applicant states that the recycle problem of high ethylene content vinyl acetate production process by first removing vinyl acetate form the product gas stream in a scrubber charged with

acetic acid, removing carbon dioxide from the recycle gas, and recycling 75 to 99% of the crude recycle gas back to the reactor, while directing 1 to 25% of the crude recycle gas to process other than vinyl acetate production. Furthermore, Applicant states that surprisingly having the percentage of N_2 and CO_2 in the recycle stream minimized to about 10% by volume over time in the reaction and with only 15% diversion of ethylene back into the vinyl acetate process has resulted in an increase in ethylene selectivity and subsequent increase in vinyl acetate production.

Williams et al. recovers ethylene from a vinyl acetate process by basically an identical process, chemical treatment. In Figure 2 of Williams et al. demonstrates that the rate of vinyl acetate production varies with the concentration of the ethylene in the feed composition. Based on the teachings of Williams et al. the concentration of ethylene increases with the removal of carbon dioxide therefore it would not be surprising to one skilled in the art that recovered ethylene, having the carbon dioxide removed, when recirculated into the vinyl acetate process would give rise to an increase in vinyl acetate production. Therefore, since the 15% diverted by Applicant into the process is ethylene that has a higher concentration because the carbon dioxide has been removed, it would be expected that the vinyl acetate production would increase with an increase in selectivity. With regard to Applicant pointing out the fact that Williams process never rose to above 90.8% ethylene selectivity, and their examples show a 93% ethylene selectivity, in Williams that figure relates to the vinyl acetate selectivity and not the ethylene selectivity.

It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to recover ethylene from the vinyl acetate process, as suggested by Williams, and produce the instant invention.

One of ordinary skill in the art would have been motivated to do this because the success Williams had with the recovery and reuse in the vinyl acetate process.

Therefore, the invention as a whole was *prima facie* obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the references, especially in the absence of evidence to the contrary.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YATE K. CUTLIFF whose telephone number is (571)272-9067. The examiner can normally be reached on M-TH 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yvonne Eyler can be reached on (571) 272 - 0871. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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